



Published weekly for employees of Lawrence Livermore National Laboratory

Friday, August 10, 2001

Vol. 26, No. 32

Lab honors Lawrence and his legacy

By Ali Carrigan

NEWSLINE STAFF WRITER

There wasn't any cake, but plenty of people were on hand to celebrate the 100th anniversary of the birth of Lab founder Ernest O. Lawrence.

The ceremony was held Wednesday in the Visitors Center. NAI Associate Director Wayne Shotts opened the event by commenting on Lawrence's life and legacies. He also introduced Lawrence's daughter, Mary Lawrence Prud'homme, and her husband,

**NNSA, UC
SALUTE LAWRENCE**
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Anthony.

"You can't talk about Lawrence without talking about the cyclotron," Shotts said. "This elegant device, not much more than a container with connections sealed with red wax, led to some great things." Those great things included a Nobel Prize in physics for Lawrence in 1939 and support for the American nuclear program during World War II.

Shotts took time to highlight Lawrence's career, spotlighting the evolution of

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FRANK NUNEZ/TID



Mary Lawrence Prud'homme, Ernest's daughter, offered thanks for honoring her father, while UC Vice President John McTague (left) and host Wayne Shotts, the NAI AD, spoke of E.O. Lawrence's accomplishments.

Astronomer's effort to find first atoms sheds light on cosmic 'Dark Age'

Using light from the most distant object known, astronomers have found traces of the first generation of atoms in the universe, 14 billion light years from Earth. The observations are the first of the cosmic "Dark Age" between the Big Bang and the first visible stars and galaxies and allow astronomers to set a date for the complete reionization of the universe.

The observations, by Robert Becker of the Laboratory as well as UC Davis, Xiaohui Fan of the Institute for Advanced Study in Princeton, Michael Strauss of Princeton University, Rick White of the Space Telescope Science Institute, and a team of scientists with the Sloan Digital Sky Survey, mark the point when radiation from the first stars and quasars tore apart and reionized — the neutral hydrogen atoms that filled space after the Big Bang.

"The history of these atoms has been part of the unknown territory of cosmology," said cosmologist Becker.

All space, time and energy began with the Big Bang. As the universe cooled, energy turned into matter. Quarks and electrons, then protons and neutrons appeared in the first minute. But at temperatures of 1 billion degrees, it was too hot for complete atoms to form. Scientists have found that it took another 300,000 years for the temperature to cool off enough for whole atoms of hydrogen to appear.

The half billion years between the formation of these first atoms and the creation of the most distant light-emitting objects detected by astronomers remains shrouded in mystery. Astronomers have dubbed this period the cosmic Dark Ages. We do know, however, that all was not quiet in these early times. Cosmic background radiation from the period of atom formation shows that matter was smoothly distributed through the universe, said Becker. By the end of

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Distant future bears bad news for runaway universe

By Ali Carrigan

NEWSLINE STAFF WRITER

We live in a universe that is expanding away from us, so that eventually all objects outside our own galaxy will be invisible. But, according to Professor Lawrence Krauss, this won't occur for trillions of years, so there's no need to worry just yet.

"I've tried to argue that the longer we wait, the less we'll see, so we should fund cosmology now," Krauss joked. "But the Washington bureaucracy moves

even slower than the expanding universe."

Krauss spoke at the Lab as a part of the Director's Distinguished Lecturer series. His talk, "Life, The Universe, and Nothing," explored several theories about the shape of the universe and its imminent demise. Krauss also opened his talk with a tribute to Ernest O. Lawrence, the founder and namesake of the Lawrence Livermore National Laboratory, in honor of the 100th anniversary of Lawrence's birth.

"Lawrence was a man who

captured the public's imagination," Krauss said of the Nobel Prize-winning scientist. "His was the idea that every time we open a new window on the universe, we're surprised by what we find. The idea that science can capture the public's imagination is a notion I'd like to carry on."

Krauss, the chair of the Physics Department at Case Western Reserve University, has written numerous books on the

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Lawrence Krauss



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prevention**

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**On the road
for Flying Doctors**

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**Get on board
the LTRAIN**

— Insert



LAB COMMUNITY NEWS

Weekly Calendar

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Saturday
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A **power outage** is scheduled from 7 a.m. Saturday to 3:30 p.m. Sunday in Bldgs. 110 and 111. Contact: Mark Cardoza, 3-0490.

Monday
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Today is the deadline to sign up for the LLL Women's Association's membership drive and scholarship **fund-raiser luncheon** scheduled for Thursday, Aug. 23, 11:30 a.m. to 1:30 p.m. at the Retzlaff Vineyards. Cost for the luncheon is \$15. Guest speaker Monya Lane will give an update on recent activity of the Commission on the Advancement of Women and Minorities in Science, Engineering and Technology. Contact: Lara Daily, 2-6932.

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Renovations to the **Central Cafe** begin today. During construction, lunch service will be offered from 11:30 a.m.-1:30 p.m. in the patio area and will include daily specials, sandwiches and salads. Modified menus are posted on the Food Services Web pages. For breakfast service, visit the South and West Cafes. For more information, go to https://www-ais.llnl.gov/llnl_only/docs/bsd/food/menu/renovations.html.

Wednesday
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The **African American Lecture Series** will feature Lennox Harris, a nuclear and radiochemistry in Chemistry & Materials Science, discussing "The Vertical Transport of Chlorine-36 Groundwater at the Nevada Test Site," at 10 a.m. in the Bldg. 361 auditorium. The series, sponsored by Chemistry & Materials Science and the Affirmative Action & Diversity Program, is intended to appeal to a broad scientific audience.

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A representative from **Fidelity Investments** will be onsite to meet with employees Aug. 15-16 and Sept. 5-6. To schedule an appointment, call 1-800-642-7131. Be sure to specify you are an LLNL employee.

Saturday
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The **Vaqueros Del Mar Scuba Diving Networking Group** is hosting a seafood festival at the Livermore Rod & Gun Club in Livermore. A full dinner of calamari, poached salmon, fish, chicken, rice and desert will be served, followed by music and dancing. For more information or tickets, go to <http://www.geocities.com/vdmdivers>.



Russian language classes begin Sept. 5 for beginning, intermediate and advanced students. Cost is approximately \$700 per student for 13 weeks of instruction.

Contact: Judy Nelson, 2-6535, for class schedule and registration form.

...

The **Health Transitions for Women Committee** will feature a video and discussion on menopause when it meets on Thursday, Aug. 30, at noon in Trailer 2679, room 1222. Contact: Marnette Yeager, 2-1217.

Symposium showcases students



FRANK NUNEZ/TID

More than 40 of the Lab's summer student employees participated in this year's Student Research Symposium held recently in the West Cafeteria. Above, Desiree Ramirez, a student from MIT working within the Lab's Environmental Restoration Division, explains her poster on "Reactor Design for Reduction in TCE and PCE." The symposium is an annual event co-hosted by the Lab's Institutional Education Committee and Science & Technology Education Program.

Applications available for leadership program

The Pleasanton Leadership Program, sponsored by the Pleasanton Chamber of Commerce, is accepting applications for participation in the 2001-02 Leadership Training Program. All LLNL employees are welcome to apply, regardless of where they live.

The driving force behind this process is the creation of good working relationships with the individuals from the Laboratory and industry. The end result is often the development of future leaders for the community.

The chamber will make the final selection of participants, and enrollment is limited. The program costs \$700, but each Lab program will pick up the internal cost for those who enroll.

The training requires a one day a month commitment for nine months, and participants are encouraged to make every meeting in order to graduate.

Applications can be obtained from the Pleasanton Leadership Program by contacting Lisa Hyman at (925) 846-5858, ext. 251, or via email at lhyman@home.com.

Applications must be submitted no later than Aug. 17. Candidates will be interviewed by the selection committee before class begins in September.

RETIREMENT

Susan E. Keyes

Susan Keyes will be retiring after working in the Health Services Department for 13 years. A celebration is scheduled for Sept. 6, from 4-6 p.m. in the West Cafeteria. Cost is \$12 and includes refreshments and a gift. Please RSVP by Aug. 24 to Misty Marin or Kena Anderson at 4-9854.



With the current power shortages in California, please turn your computers and other electronic equipment off when you leave your work area.

Not only does this save power, it is also an excellent computer security measure. One should never leave a computer powered up and unattended for long periods of time.

IN MEMORIAM

Francis Newbold

Francis A. Newbold, a former electronics engineer, died July 10 at St. Gregory's Nursing Home in Castro Valley. He was 79.

Newbold came to the Lab in 1958 and worked for 30 years as an engineer. He retired in 1988.

He was born in Bristol, R.I., and graduated from Providence College in 1942. He served in the Navy during World War II and the Korean War.

Survivors include his wife of 48 years, Allie May; daughter, Roberta; and a granddaughter.

Newsline

Newsline is published weekly by the Internal Communications Department, Public Affairs Office, Lawrence Livermore National Laboratory (LLNL), for Laboratory employees and retirees.

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Distribution: Mail Services at LLNL

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Telephone: (925) 422-4599; Fax: (925) 422-9291
e-mail: newsline@llnl.gov or newsline@llnl.gov
Web site: <http://www.llnl.gov/PAO/>

Printed on recycled paper

AROUND THE LAB



Lab scientists serve international nonproliferation effort

By Don Johnston

NEWSLINE STAFF WRITER

Through the United States Support Program (USSP), scientists from Livermore, other national laboratories and industry provide support to the International Atomic Energy Agency's efforts to prevent the proliferation of nuclear weapons.

The support program is managed by the International Safeguards Project Office (ISPO) at Brookhaven National Laboratory, which serves to match technical expertise and technology in the United States to requests for assistance from the International Atomic Energy Agency (IAEA), based in Vienna, Austria.

"We help the IAEA Department of Safeguards get the tools and information they need to make decisions and otherwise conduct their work," said Susan Pepper, head of the ISPO.

Pepper and members of an interagency committee made up of representatives from the U.S. departments of State, Defense and Energy and the Nuclear Regulatory Commission were at the Laboratory last week to learn more about Livermore technologies and research that could benefit the IAEA safeguards efforts.

The IAEA promotes peaceful uses of nuclear energy and verifies that nations don't use nuclear technology for the development of weapons. IAEA inspectors verify compliance with international nonproliferation agreements and monitor inventories to make sure nuclear material is not diverted for weapons development.

"The technology and expertise we provide help the inspectors do their jobs better," Pepper said.

Technical areas where the United States is providing strong support to the IAEA include nondestructive analysis, the design and implementation of remote monitoring systems, containment and surveillance capabilities, information collection and analysis, as



Susan Pepper of ISPO, second from right, and members of an interagency committee hear about Livermore technologies from Laboratory scientists.

JERRY WOOD/NAI

well as other aspects of information technology.

ISPO recruits "cost free experts" — no cost to the IAEA — for temporary assignments in Vienna of up to two years. The costs of these temporary staff positions are covered by the U.S. Support Program. ISPO also helps the IAEA recruit U.S. citizens for regular staff positions in the Department of Safeguards.

Currently, Lab employee George Anzelon of Z Division is on a two-year assignment providing information collection and analysis support to IAEA safeguard programs. Jor-Shan Choi, of the Energy and Environment Directorate recently completed an assignment in Vienna for the IAEA's Nuclear Energy Department. "This is a way to help an international organization doing important work," Pepper said, "and there's value to the national laboratories in having people work with the IAEA in Vienna."

The USSP is primarily funded through the U.S. Program of Technical Assistance to IAEA Safeguards, but receives additional funding from the State Department's Non-proliferation and Disarmament Fund, DOE's International Safeguards Program, the Nuclear Regulatory Commission and the Department of Defense. Since the IAEA's budget is constrained by a zero real growth budget, extra budgetary contribu-

tions such as those provided through the USSP are critical to helping the IAEA meet new requirements.

The IAEA's deputy director general for safeguards makes formal requests for assistance, called "tasks," to the USSP. ISPO reviews the requests and seeks contractors from both the public and private sectors to perform the tasks. The USSP has sponsored work to assist the IAEA in developing programs in environmental monitoring, remote monitoring and information technology.

Nancy Suski of the Nonproliferation, Arms Control and International Security Directorate, Lab point of contact with ISPO, says that in addition to providing long-

term consultants, the Laboratory sends scientists for assignments of a few days or weeks. "These assignments provide a great insight," Suski said. "From a programmatic point of view we learn a lot about the IAEA's work needs, the agency's limitations and how the Laboratory can help fill those needs."

Through these assignments, the Lab has established "long-standing relationships" with the IAEA of mutual benefit, she said.

"From here in California, it's hard to appreciate the work IAEA does day to day in Vienna and in the field," Suski said. "The Lab people who work in Vienna give us an international perspective. We get a better understanding of how the United States is perceived by the international community. Through those who work in Vienna, we can appreciate both the political and the technical dimensions."

While the primary focus of the laboratory's work for IAEA is in safeguards, Suski said, "there are also opportunities in the support labs and other departments."

For more information about the US Support program and ISPO, check the Web at: <http://www.bnl.gov/ispo/> or contact Nancy Suski (suski2@llnl.gov).

New phone and Web 'help desk' offer employees ISSM resource

Help is just a phone call — or mouse click — away.

The Safeguards and Security Department has created a new Help Desk phone line and webpage to answer employee questions. By simply dialing 222 from any Lab phone, users will be connected to a menu of options, one of which allows the user to speak to an operator.

"We designed the system so that you can get back to the operator at any time," said Safeguard and Security representative Michel Dahlstrom. "We understand that it can be very frustrating to get stuck in an automated recording, and we want this system to be user-friendly."

According to Dahlstrom, the idea of a Security phone line and webpage has been around for some time, but "the Integrated Safeguards and Security Management process that the Lab is currently developing helped push the idea to the forefront."

Employees who call the phone line can choose to speak directly with an operator during normal business hours. They also have the option of getting information about their directorate point of contact or for a Safeguards and Security topic expert.

"People can contact the security employees who know all about things like computer security, foreign national visits, or escorting," Dahlstrom said. "We have a limited menu of topics now, but we're hoping to expand that as time goes on."

Much of the same contact information is available on the internet, including an employee feedback form.

"The employee feedback form can be used to raise questions or make suggestions anonymously," Dahlstrom said of the website. "But if people want a

reply to a question, they have to give us their contact information since we're not posting any questions on the website at this time."

The website can be accessed by going to the Grapevine Intranet page at <http://www-r.llnl.gov/> and clicking on the Safeguards and Security link. Alternatively, the help site can be reached directly by going to [\[r.llnl.gov/ssp/issm/Input_Form.html\]\(http://www-r.llnl.gov/ssp/issm/Input_Form.html\). This will link employees to the feedback form and security contact information.](http://www-</p>
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"Both the phone and website help desks were designed to improve employee communication with the Security Program," Dahlstrom said. "We want people to get their questions answered, and we want to improve security's service at the Lab."

Virus alert for users of Microsoft Windows



CIO UPDATE

BY TED MICHELS

An urgent message to LLNL Users of Microsoft Windows: Update Your Virus Definitions Immediately

Last week a new virus called "Sir Cam" appeared on the Internet. This virus randomly takes Microsoft Office documents from your hard drive and e-mails them to addresses in your Outlook address book.

Each day since this virus appeared, LLNL has received hundreds of infected messages that have been detected and stopped by the Lab's institutional e-mail virus checker. However, we have

had at least two cases in which the Sir Cam virus got through our first line of defense and arrived at a user's desktop. Fortunately, in both cases, the users were running up-to-date virus definitions and the Norton Anti-Virus software caught the virus before it could infect any files.

Therefore, all users of Windows are urged to update their virus definitions right away in case any more infected e-mail messages make it through our defenses. Remember, the Laboratory has a site license for Norton Anti-Virus software to protect all users from viruses.

However, this software is only effective if the virus definitions are updated regularly. Once a month is usually appropriate, but when new viruses appear, updating more often from the Norton Website is the way to make most effective use of this protection.

Ted Michels is the principal deputy associate director for Computation and LLNL's acting chief information officer.



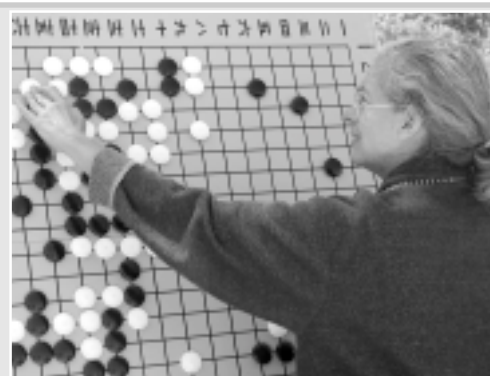
NEWS YOU CAN USE



Networking through LLESA

Hundreds of employees came out last week for the LLESA picnic, featuring demonstrations of the various networking groups: (clockwise from left) instructors Kurt Sensor and Patty Vo demonstrate their champion swing steps, Lynda LoDestro plays the Asian game of Go, Steve Murray and Tim Ford from the fencing group thrust and parry, and employees' children race toy dragon boats from the Chinese American group.

Photos by Sheri Byrd



Technical Meeting Calendar

Friday
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INSTITUTE FOR SCIENTIFIC COMPUTING RESEARCH
"Efficient Query Processing Over Large Multidimensional Datasets," by Sharad Mehrotra, University of California, Irvine. 10 a.m., Bldg. 451, room 1025. Contacts: Ghaleb Abdulla, 3-5947, or Leslie Bills, 3-8927.

MATERIALS RESEARCH INSTITUTE
"Cluster Chemistry," by Mark Pederson, NRL. 9 a.m. Bldg. 661, room 13 (open area). For more information see <http://education.llnl.gov/mri/>

H DIVISION
"Optical Excitations of Semiconductors from the Exact-Change Density-Functional Theory," by Yong-Hoon Kim, Technische Universitaet Muenchen. 10 a.m., Bldg. 219, room 163 (uncleared area). Contacts: Giulia Galli, 3-4223, or Darlene Klein, 4-4844.

MATERIALS SCIENCE & TECHNOLOGY
"Film Growth by Gaseous and Solution Reactions at Transition Metal Surfaces," by Roger Qiu, University of Riverside. 9 a.m., Bldg. 151, Stevenson room (uncleared area). Contact: Jim De Yoreo, 3-4240, or Roberta Marino, 3-7865.

Tuesday
14

MATERIALS SCIENCE
"Cathodoluminescence Speciation of 3w Induced Defects and Environmental Scanning

Electron Microscopy," by Marion Stevens-Kalceff, University of Technology, Sydney Australia. 10:30 a.m., Bldg. 319, room 205. (open area). Contact: Jan Vahlensieck, 2-6530.

MATERIALS SCIENCE & TECHNOLOGY
"Calcium Segregation at Antiphase Boundaries in Pigeonit," and "On the Interaction Between the Ag-depleted Zone of Gamma Plates and Spinodal Decomposition in an A1-22At .% Ag Alloy," by Kevin Moore, John Hopkins University. 10:30 a.m., Bldg. 235, Gold Room (uncleared area). Contacts: Juergen Plitzo, 3-9335, or Roberta Marino, 3-7865.

Wednesday
15

CHEMISTRY & MATERIALS SCIENCE
"The Vertical Transport of Chlorine-36 in Groundwater at the Nevada Test Site," by Lennox Harris. 10 a.m., Bldg. 361 auditorium. Contact: Tuijauna Mitchell-Hall, 4-4469.

SYSTEMS & NETWORK DEPARTMENT
Macintosh Technical Seminar Series. "Building the Future: Mac OS X & Beyond; An Overview for UNIX, Java, and Web developers," by Ernie Prabhakar, Apple Computer. 10:30 am, Bldg. 543 auditorium (uncleared area). Contact: Becky Frank, 3-2879.

Thursday
16

MANUFACTURING AND MATERIALS DIVISION
"Financial Operations Forum," by Garith Helm. 1:30 p.m., Bldg. 543 auditorium. The session is open to all

Engineering, program and other interested employees. Contact: Garith Helm, 2-7784.

Friday
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CHEMISTRY & MATERIALS SCIENCE
"1H NMR Studies of Structural and Dynamic Properties of Hemoproteins," by Anh-Tuyet

Tran, University of California, Davis. 10 a.m., Bldg. 151, Room 1107 (uncleared area). Contacts: Robert Maxwell, 3-4991, or Bonnie McGurn, 3-2764.

MATERIALS SCIENCE & TECHNOLOGY
"Challenges in Demonstrating the Waste Package Performance Requirements at Yucca Mountain," 3:30 p.m., Bldg. 235, room 1090 (uncleared area). Coffee and cookies will be served at 3:20 p.m. Foreign nationals may attend if an appropriate security plan is on file. Contact: Thomas E. Felter, 2-8012.

INSTITUTE FOR GEOPHYSICS & PLANETARY PHYSICS
"Close Pre-Main-Sequence Binaries," by Goesta Gahm, Stockholm Observatory. Noon, Bldg. 319, room 205. Contact: Joanna Allen, 3-0621.

The deadline for the next Technical Meeting Calendar is noon, Wednesday, August 15.

NEWS OF NOTE



On the road with medical supplies for Flying Doctors

By Elizabeth Campos Rajs

NEWSLINE STAFF WRITER

For many people, retirement means a slower way of life. Time to travel, visit grandchildren and putter in the garden.

But Fred Roads is not most people.

When he retired from the Lab in 1989 after 30 years in Mechanical Utilities, he stepped up his volunteer efforts for the Flying Doctors, a non-profit organization that donates medical services and supplies to Mexico.

Roads, who is back at the Lab as a consultant, spends much of his spare time driving around the Bay Area picking up donated medical supplies.

"On a recent Saturday I went to San Jose, Gilroy and Santa Cruz with a rented truck and picked up supplies. I do that once a week," Roads said. "I picked up hospital beds, dental chairs, X-ray machines and boxes of all kinds of supplies. I make a lot of crates for the sensitive stuff."

He stockpiles the donated goods in three rented units at a Livermore storage facility until he has enough to fill a 53-foot trailer on an 18-wheeler. That happens about once every three months.

For Roads, 68, sending medical supplies to Mexico is more than just helping others. It's also a way of giving back for the help he received as a young boy.

"When I was growing up in Napa Valley, a commodity truck filled with sacks of beans, oranges and flour would come through town. All of the poor people could go and get this stuff. I remember getting stuff from that truck," Roads recalled. "I've had a good life. It's nice to be able to give something back."

On a recent Saturday, he and his family, friends and four Lab co-workers started loading the truck at 7 a.m. There were several wheelchairs, dozens of crutches, a few examining tables, two cell-sorting machines and boxes and boxes of supplies crammed into the storage units.

Roads was up and down the ramp into the truck pushing cartloads of boxes, hauling wheelchairs and anything else he could pick up. He unpacked the dollies others pushed up the ramp, handing off packages to co-worker Michael T. Martin, who was stacking the boxes



ELIZABETH CAMPOS RAJS/NEWSLINE

Fred Roads and Michael T. Martin load medical supplies on a truck bound for Mexico.

inside the truck.

Working at a frenzied pace, Roads was easily doubletipping his teenage grandchildren and nearly all of the other volunteers.

For Martin, an inspector in Plant Engineering, that Saturday was his second volunteer effort. He got involved as part of the Amigos Unidos Hispanic Activity Group. On this day, he brought his 12-year-old son, Samuel, along to help.

"I did it a few months ago with my older son,

who is now off at college. I wanted to bring my younger son out to let him experience what it is to volunteer our time and effort to a good cause," Martin said.

Also lending a hand was Steve Mayhugh, a maintenance coordinator who worked with Roads at the Lab.

"For me, it's a church mission, a way of helping others. Fred's also my best friend," Mayhugh added.

Roads estimated it would take three hours to load all the donated equipment and supplies into the big rig and then it would be on its way.

"We load the truck here and it goes to El Paso where it is unloaded. Then an inventory list is sent to Mexico City where it goes out to Red Cross clinics and hospitals," Roads explained. "It takes about a month to get the paperwork through."

He is listed as the point of contact on the Flying Doctors' Website for medical supplies and donations, which he receives from hospitals, supply houses and individual doctors. He also occasionally places an ad in the *Newsline* classifieds seeking donations.

He enlisted the help of his longtime friend, Lab employee Xavier Cabrales, a member of Amigos Unidos, for assistance with any correspondence to Mexico.

Roads joined the Lab in 1957 as a maintenance coordinator. Before he retired in 1989, he had already started volunteering for the Flying Doctors organization.

"In the late '80s, I read a *Newsline* article about Fred Allen, who had gone down to Mexico with Flying Doctors. I thought that would be something my wife would enjoy," Roads recalled recently. "I started driving her to meetings and I got involved."

It was at one of the meetings that volunteers were requested to load a truck with medical supplies.

"I'm dumb and strong and I volunteered to help then. Over the years, I got more and more involved," Roads said with a laugh.

About two years ago, he took over as the primary organizer of the donation effort.

"The man who coordinated these donations had to retire because he was 85 and his knees were giving out on him," Roads said.

To find out more about his work or to volunteer for this effort, contact Roads at 2-7661.

KRAUSS

Continued from page 1

early universe and cosmology.

"All the physics points to the fact that we live in a universe that is flat," Krauss continued. "But we're trying to find a way to prove that we live in a curved universe." He noted that what people see when they look at stars is actually the way the star looked 10 billion years ago, as the image has taken that long to reach Earth.

"So in theory, we could look far enough out into space and we'd see the Big Bang," Krauss said. "But we can't see that far, because there's basically a wall of plasma breakdown in the way." This "wall" of plasma, coupled with satellite imagery, has led scientists to believe that the universe is, indeed, flat. But as Krauss pointed out, "there's not enough matter in the universe to make the world flat."

"Where does that matter come from?" Krauss asked. "We look to exploding

stars. When a star explodes, it is as bright as the entire galaxy momentarily."

Krauss also said that astronomers and cosmologists previously believed the universe to be slowing down, or collapsing in on itself.

"But it seems now that the universe is actually speeding up," he said. "The only way there can be enough 'empty space' for all the star matter is if the universe is pulling apart."

The implication of these theories is, according to Krauss, a miserable future.

"In time, all objects outside our local supercluster of galaxies will become invisible – as the universe expands exponentially, they will literally be pulled too far away to see," Krauss said.

Krauss ended his talk by stating that cosmologists cannot be sure what the distant future holds for the universe.

"We need infinite time to determine the ultimate fate of the universe, but we have only a finite time left," he concluded.

African American lecture looks at chlorine transport

Lennox Harris of Chemistry & Materials Science is the featured speaker for the next African American Lecture Series at 10 a.m. Wednesday, Aug. 15, in the Bldg. 361 auditorium.

Harris, a nuclear and radiochemist in the analytical and Nuclear Chemistry Division, will discuss, "The Vertical Transport of Chlorine-36 in Groundwater at the Nevada Test Site."

He is the technical manager of the Underground Test Area Operable Unit, Hydrology and Radionuclide Migration Program. Harris is responsible for data management and analyses, budget, quality assurance and participating in research on radionuclide migration.

He received his bachelor's degree in chemistry from UC Davis and his master's degree in chemistry from San Jose State University.

The lecture series is hosted by Chemistry & Materials Science in collaboration with the Affirmative Action & Diversity Program to create a forum for the Lab's African American scientists and engineers to showcase their work. It is intended to appeal to a broad scientific audience.

LAWRENCE
Continued from page 1

the handheld cyclotron to the eventual 184-inch cyclotron built at what would become the Lawrence Berkeley National Laboratory. Lawrence's invention would pave the way for nuclear research.

The E.O. Lawrence Award was established, in 1959, in Lawrence's honor, to recognize exceptional contributions to the development, use or control of nuclear energy. Shotts, himself a Lawrence Award winner, recognized several of the Lab's other award winners in the audience, including Dick Fortner, Grant Logan, Bill Lokke, Seymour Sack, Lowell Wood and George Zimmerman.

Other medal winners attending included Rulon Linford, assistant vice provost of the University of California, and Tom Cook of Sandia-Livermore.

"I'm sure that Lawrence's work serves as an encouragement to others to follow in his footsteps," Shotts said of the memorial award.

John McTague, the University of California's vice president for Laboratory Management, read a letter from UC President Richard Atkinson in honor of the event. Atkinson remarked that "Lawrence stands out as one of the UC's most distinguished scholars, and certainly its most notable physicist."

"We have these remarkable labs which have prospered over the years by attracting the best people to them," McTague said. "That's Lawrence's legacy — 100 years later, he's still attracting the best people to him."

Deputy Director Jeff Wadsworth continued the program by reading a letter of congratulations from the administrator of the National Nuclear Security Administration, Gen. John Gordon. He also read a resolution from the Livermore City Council commending the Lab for its work in science and in the

community.

"Lawrence insisted on academic and scientific excellence, and emphasis on big science, a team approach, and the merging of basic science with practical engineering," Wadsworth said. "Director Bruce Tarter likes to say 'It's still Lawrence's Lab'."

After Wadsworth spoke, new displays chronicling Lawrence's life and highlighting the Lawrence award winners were unveiled. To close the event, Lawrence's daughter Mary said a few words about her father.

"My father would spend his days in Berkeley and his nights out here working," Prud'homme recalled. "It's very gratifying to know that both the Livermore and Berkeley labs have flourished and grown since my father worked here."

The displays of Lawrence and the E.O. Lawrence Award winners will be on exhibit in the Visitors Center for the next month. The Visitors Center (Bldg. 651) is open Monday through Friday from 1 to 4 p.m.

0960

Full size comforter, red and white stripes, sheets/pillowcases to match, 2 red throw pillows, white bed skirt for \$40.00. 209-599-5391

2-Tickets(Concord Pavilion) August 15th Stevie Nicks Section 101 Row P \$150.00 925-778-4055

Maternity clothes all sizes all seasons includes bathing suits great condition and books on pregnancy and breast feeding. 925-684-3709

6 ft wide vertical sliding blind for sliding door. Off-white, textured surface. \$20.00 209-823-3599

Doll Set Power Ranger, Trini & Kimberly, box unopened, large beautiful dolls, 1994 collectible set with ranger/school clothes, best offer, 925-931-1908

Entertainment center on casters/60Wx48Hx20D. Sauder, contemporary style oak finish. Holds 25-in. TV. Component shelves w/cupboards. \$75/OBO. 925-447-4352

For Sale: 10in Contractors Table Saw in good condition \$175, New 16gal Shop Vac \$50. 925-294-8781

LITTLE TIKES huge blue/white toybox \$20, small wooden rocker \$20, Erector Set Junior \$10. 925-455-4666

Misc. items: heavy oak end table w/drawer \$25; 5ft oak framed mirror w/blue stained glass \$75. 209-839-9757

CANNA plants dark leaves red flowers 3ft 5gal \$5 ea. 925-447-6192

Aerosmith tickets, Tuesday, August 14, Chronicle Pavilion. Section 208, row FF, seats 3/4. Tix cost \$78.95 plus handling, will sell pair for \$150. 925-426-1839

GARAGE SALE. Saturday, 8/4/01. 1346 Lexington Way, Livermore. Furniture, CDs, clothes, Avon products, books, bedding, and etc. From 9:00-2:00. 925-449-8131

Moving Sale! Futon \$125, Sofa and Love seat \$150, tea table \$50, high chair \$30, changing table \$20, Washer and Dryer and a lot more, negotiable! 209-832-3297

Ceramic molds please leve message 925-830-1518 925-447-6903

Baby fence, white wrought iron with swinging gate. Extends to 8 feet. Paid \$100+ at Cartans last year. Selling for only \$50. 925-648-0671

Freezer, Upright about 17 cu ft. \$125 209-239-5625

Foley Belsaw 308 chainsaw sharpner,508 sharpsall.Manual & many grinding wheels. \$350.00 for both 209-836-0631

Tickets to Wynonna Concert at Wente Vineyards Buffet Dinner and Good seating. Aug. 14th. Two tickets available at \$ 139.00 ea. 925-373-8360

Medium patio doggie door \$60. Tire bubble balancer \$40. Sauna \$500. Serwin Vega speakers \$500. Two head bubble gum machine \$50. 209-234-3854

Coffee maker (\$10), CD/cass/AM/FM stereo (\$45), Vacuum 10Amp (\$30), wood shelf 28.5x12x70inch (\$40), table 24x24x24, phone, iron, blender, toaster 925-371-1748

MOTORCYCLES

2001 - BMW R1100RS-L (Light) Black/Carbon Fiber, ABS, low miles, as new condition, 7 year unlimited mile warranty 209-599-1059

1995 - KZ1000P Police Bike. Very Good Running Shape 60k miles. Everything is there and it works except the siren. \$3000 obo.

Leave message. 925-989-6299

1994 - Custom Softail - Over \$30K Invested, Custom Everything, Fuel Injected and Fast! Billet Wheels w/New Tires, Thunderheader, must sell! \$16,900.00 obo. 209-815-3948

1987 - Yamaha Moto4 quad runner. Exc. condition, runs good,lots of new parts. \$1700 obo. contact Tyler 925-443-4350

1992 - Kawasaki MX/KX 125cc, new suspension, new rims, tires, Quick extra parts. \$1800 O.B.O. 408-897-3056

MUSIC INSTRUMENTS

Player Piano: Aeolian with rolls. Well maintained, 20 yrs old, Oak. Manual play or automatic. \$1800 209-834-0657

Suzuki violin, 1/8 size, Wolf violin headrest (1/2 size), both like new. Make offer 925-292-7799

Old upright piano. Sounds Great. \$500 OBO 925-803-1191

Alto saxophone, Selmer Signet (one above Bundy). Used 1 year by Livermore high school band student. Excellent condition. \$600 925-455-5814

Appolo, hollow body, base gitar. \$140 209-239-5625

PETS & SUPPLIES

Beautiful paint filly,started on cutting,exellent bloodlines,would make a greate ranch horse.coming on 4 yrs.your gain my loss 4,000. O.B.O 925-371-5371

Free adult female cat, Tortie coloring, green eyes, spayed, 6 years old. Moving; must give away. 209-835-8065

Boa Constrictor, 3 1/2 ft. \$150.00 OBO. 925-447-0918

Dog door for sliding door, size large \$50.00 925-443-4349

Reg. Paint,very gentle, excelent ranch horse,ropes, cuts cattle, a real good one, 8 year old gelding. \$4500 209-823-7655

Chow-Chow Beautiful Red Male 3 years old. Very quiet good natured. Free to mature adults who understand Chows. Not for small children. 925-373-0626

COCKETEILS: 2 same sex, Grey w/Yellow & Orange coloring, \$25/each. LARGE CAGE 48x36x24 paid \$200 will sell for \$150 + SMALL CAGE \$50. 510-581-1905

Rott pupps 8wks first shots and tail dock mother and father on site large size and good temperment no papers \$200.00 209-858-5876

Rotweiler 8mth male, Dalmation mix 3y male, Queensland Heeler mix 1.5y male, blk female cat 1.5y (fixed/declawed) need good homes. (cell) 510-912-4466

Horse Bedding - Dust-free fur shavings in plastic bales, compressed 12cf - \$5.75 each. 925-443-1547

Two kittens seek loving home. 3 month old calico female and b/w male. Altered and had first shots. Available as a pair or seperate. Donation. 925-455-4208

KOI Fish aprpx. 18in to 24in, healthy & in same pond for 7 yrs;\$150-250/BO. Also some pond supplies. 209-858-4422

RECREATION EQUIPMENT

Dive Gear, Dry suits, full face AGA, Tac 100 Nav. board, too much to list. 209-599-1059

Swing set, fairly large with love seat, good condition, you disassemble and remove

\$60.00 925-443-4895

LLBean sleeping pad, double wide. Never used. New \$89.00, only \$50.00. 209-823-5845

Golf clubs, left handed, XPC 2000 tri-metal custom woods/irons/bags. \$ 300 925-447-5399

5hp ROTOTILLER \$125 209-239-5625

Porter basketball backboard&hoop, white, wall/eve mounted, \$20. 925-455-6089

1986 Shasta Tent Trailer, sleeps six, propane stove, sink, new mattress pads, new tires, good maintained condition, \$1400.00 925-443-2529

RIDESHARING

Tracy - Looking for passengers for new carpool. Hours M-F 8-4:45. 209-833-1201, ext. 2-9955

San Ramon - Bollinger Canyon/Dougherty area. Looking to start a carpool or join an existing one 925-292-7799, ext. 2-1859

Marin County - looking to start/join carpool from Marin to LLNL. 415-482-6685, ext. 2-3832

Modesto - VANPOOL FOR 4-10s We run 5 days/week 6 to 4:30. Have room for 2 more riders. Ask for Alan Gilkison 209-667-2365, ext. 2-8321

Ceres/Modesto - 14 psgr Enterprise luxury vanpool, 7:00-3:30, \$120/month 209-537-0229, ext. 3-6631

Modesto - 14 passenger vanpool, captains chairs, individual reading lights, optional, but save extra by helping to drive. 8 - 4:30 schedule. 209-521-9047, ext. 2-5177

SERVICES

Roofing, 28 yrs experience, fully insured 925-454-9200

It is a good time to paint! Interior & Exterior. 18 yrs experience. Excellent workmanship. Free estimates. References available. 510-537-7222

Housekeeping, call for quote. References available, Tri-Valley area only. Daytime phone (925)980-0433. 408-897-3056

Int/Ext Paint services. 15yrs exp. Free estimate. Call (925)778-8345 or 510-482-9833

SHARED HOUSING

Tracy -- - Room available in 4BR/2Bth home \$450. Shared use of kitchen, laundry room, and bath. Minutes from freeway. 209-833-1201

Livermore - good size room, optional furnishings, convenient location, much more - great place, long or short term, NS \$450 + 1/3 util 000-449-3165

Tracy, CA - Room for rent, furnished/unfurnished. Bath, use of kitchen, laundry room, garage, share utilities No children/pets/smoking. \$550. deposit, \$550.mo. 209-832-3343

Tracy - Room for Rent in Tracy. Easy free-way access. Large, beautiful home w/pool. No pets/smoking. Available now. \$500/mo plus 1/3 PG&E. 925-413-7339

Livermore area - lab sicientist and wife seek one year house-sit or rental start Oct 1, no smoke/ kids/pets. Need peaceful setting for spiritual growth. 415-482-6685

Modesto - Room for rent \$325.00 + partial utilities. Separate bathroom and full privileges. Most pets okay. 209-537-8458

Room for rent. Kitchen & laundry privileges. .

Share house with myself & son \$475. includes PG-E, Water,Garbage & Cable. 209-832-9555

Livermore - -Share clean 3 BD, 2BA home, simple furnishings available or unfurnished, full privileges, N/P, N/S; \$500 + share utilities. 925-455-5362

Livermore - Room-full prev in 3BD/2BA newer home,clean/quite,N/S,N/P,great location (3.5 miles from lab).\$550.00 1/3 utilities,Ideal for grads,female preferred. 925-413-0407

Livermore - Room in 3/2 home, partially furnished if needed, avail. 8/1. \$500.00, Springtown 925-858-5184

TRUCKS & TRAILERS

1986 - Shasta tent trailer, sleeps six, propane stove, sink, new mattress pads, new tires, well maintained, \$1400.00 925-443-2529

1992 - 4 Runner 4X4 SR5,V-6,5sp man,All Pwr,Cass/CD,alloy whls,tow,pkg,K&N,reg main,8000. OBO 209-463-0457

1998 - Chevy \$10 4 cyl 3door king cab snug top tow pkg custom tint low mileage 23k \$11,500 OBO 925-634-3318

2001 - For Sale: 2001 30 foot Airstream Excella w/ all bells and whistles. Better than new condition. Call 925-437-1792.

1985 - Flat bed utility trailer, 6 X 9 ft, 16 inch dia wheels, \$125.00, Livermore 925-443-2271

1998 - Dodge Dakota extended cab. Low miles, 4 cyl, 5 speed, alloy wheels, bed liner, fog lights, cd player, ac, lowered. \$9,500. 925-443-1390

1996 - Nash Fifth-wheel, 21.5 feet, sleeps 6, solar, extras.Roomy, but small enough to fit in National Park campgrounds.\$12,000 925-447-7751

1992 - TIOGA 27ft MOTORHOME CLASS C Ford 460, 44k miles, walkaround bed,new tires, new batteries, 4kw generator, EXCELLENT CONDITION. \$19,000.00 925-240-5915

Jet ski trailer. Will hold two stand up models. Can be converted to box trailer 400.00 or best offer. 925-680-7444

1989 - Bronco XLT 5.0 loaded,2nd owner, all service maint. records rblt. trans and motor. \$5800 OBO 925-846-0717

1984 - Chevy K5 Blazer. Needs front axle. New transmission, battery, u-joints. Rally wheels, good transfer case, removeable top. Make Offer 925-449-0865

1994 - Masda B2200 PU 84k miles, 34k miles on engine good running condition, good tires. \$3750 925-447-8138

1997 - 1/2 ton GMC Sierra PU, extd cab, 5.7 liter V8, 255 HP, AR wheels, matching fiberglass bed cover. Low mileage, mint condition. \$19,500. 925-449-3478

1994 - Ford Explorer, 4x4, Eddie Bauer loaded with options including, black tube brush guards, steps and class 3 towing package, \$8800. 925-989-3343

92 - Chevy Suburban,2500,4x4,3/4 ton,454cc,Built for towing,Power everything,rear A/C,3rd seat,heavy duty tow pkg,white,166000 miles,Exlnt cond,\$12k OBO 925-449-7664

1995 - Nissan,Pickup XE King Cab,5 speed,air,camper shell,and more.Like new 53kmiles,one owner,\$7000 obo 209-858-5807

VACATION RENTALS

SOUTH LAKE TAHOE - 3 Bedroom 2 Bath Chalet, nicely furnished, all amenities,quiet

area, park w/lake,tennis etc. Great for families.Hurry for Summer! Reserve Now! 209-599-4644

Pinecrest - (Off Sonora Pass Road), 3 bdrm/2 bath, frplc w/wood, BBQ, pool table, large deck and view up No. Fork of Tuolumne, Labor Day Wknd available, \$250 925-449-5513

Strawberry, Hwy 108 - near Pinecrest Lake and Dodge Ridge. 3BR/1Ba Sleeps 6. Knotty Pine Interior \$100/night. 925-413-7908

Maui, HI - Kahana Reef oceanfront 1BR/1BA condominium. Beautiful two-island view, oceanside pool, and BBQs. Low LLNL rates for year-round reservations. 925-449-0761

WANTED

Wanted: Apartment/portable clothes washer that will hook up to kitchen sink, for reasonable price. 925-443-0743

Sega Genesis system and games please. 209-531-1527

Need someone to do a small concrete job in my back yard (around 40 sq ft) for a reasonable price. 925-371-1607

Will pay well for you to cook my lunch/dinner in your Livermore home for once daily pick-up M-F. You must love to cook delicious & diverse dishes. 415-482-6685

WANTED: Pre-season football tickets for the San Francisco/Raiders game on August 19. Looking for 2, but would like more. Please call 925-449-7441

Looking for retired Kitchen cabinets to put in garage. 925-487-5985

Moped or Mini-bike, working or not. Teach kids about motors, mechanics and have some fun. Willing to pay a fair price, perhaps up to \$100.00 925-443-7729

Lathrop/Manteca/Stockton two slots open for Carpool riders to join existing, meet in Lathrop. 209-465-2009

Portable, canopy CAR PORT, estimate 8ft. wide by 28ft. long, please call 209-492-0270

Your good used books are needed at the Buenas Vidas Youth Ranch Thrift Store, 116 North L Street, Livermore. Open 7 days/week. Thanks! 925-449-7702

1971 Graduates from Livermore and Granada High Schools; 30-Yr reunion on 8/18/01. 925-455-6239

Silver coins! 925-447-4711

Recumbant exerise bike for disabled person. Under \$40.00. 510-537-7222

Seeking full time office assistant. Entry level position. Great opportunity for someone looking to gain work experience. 925-784-0566

Regulation Size Billiard Table in good condition. Willing to offer a fair price. 925-960-1812

Giants tickets for August 18 or August 19, 2001/PACBELL park. 209-832-4314

Ceramic Tiles: Broken or whole, need for Girl Scout Event in October. 209-835-5031

Looking for Granada High School Alumni from the class of 1991 for 10-Year Reunion. If you are a classmember or parent call 925-447-2644



THE BACK PAGE

NNSA, UC, Livermore salute Lawrence's influence

Editor's note: A ceremony to honor the centennial anniversary of the birth of Ernest Orlando Lawrence was held Wednesday at the Visitors Center. In honor of the Lawrence centenary, several proclamations were presented. What follows is the text of each proclamation, addressed to Director Bruce Tarter or the Laboratory in general.

Statement by NNSA Administrator Gen. John Gordon

Dear Dr. Tarter

It is fitting that you should honor the Laboratory's Lawrence award winners on Dr. Ernest O. Lawrence's 100th birthday because their achievements — and the Laboratory's success — mirror the standards and drive of your namesake.

Dr. Lawrence was truly one of the great scientists of the 20th century; his contributions changed the course of nuclear science and will last far into the future.

His most enduring legacy however, may be in the Laboratory he was instrumental in establishing in Livermore. By embracing Dr. Lawrence's philosophy of science and his enthusiasm for advancing human understanding of the universe, the Lawrence Livermore National Laboratory has placed itself at the forefront of the world's great institutions.

Everyone at the Laboratory should take tremendous pride in its role in preserving the peace and protecting the security of the American

people. All should bask in the knowledge you have lived up to the expectations of one of America's brightest intellects.

Sincerely,
John Gordon
Administrator,
National Nuclear
Security Administration

Statement by UC President Richard Atkinson

In the long and illustrious history of the University of California Ernest Orlando Lawrence stands as one of its most distinguished scholars and certainly its most influential physicist. His invention of the cyclotron in the waning days of 1929 earned him a Nobel Prize, the first to be awarded to a UC faculty member. The invention accelerated the revolution then under way in physics and led to the formation of the great laboratories at Berkeley and Livermore that bear his name today. His multidisciplinary approach to science became the model for national laboratories across the United States. In the years before large scale government funding, as the shadow of world war spread across the oceans, his unselfish willingness to share the resources of his laboratory set a standard for public service to the nation that remains with us today.

On this centennial anniversary of Ernest

Orlando Lawrence's birth, the University of California proudly takes note of his great scientific accomplishments and his enduring legacy of public service.

Richard C. Atkinson
President
University of California

Livermore City Council Resolution

On Aug. 8, 1901, Ernest O. Lawrence came into this world and would later become a world famous physicist and Nobel Prize winner,

Whereas, Ernest O. Lawrence helped choose Livermore as the site for the national laboratory that today bears his name and provides the largest source of employment and resources for the Livermore community,

Whereas, the Lawrence Livermore National Laboratory has made major contributions to the nation's scientific and technical needs in defense, energy, bioscience, and other fields,

Therefore be it resolved that the City of Livermore salutes the 100th anniversary of the birth of a great scientist and patriotic American whose life had a great and positive effect on the community of Livermore and the nation.

To be passed by the Livermore City Council on Aug. 13, 2001.

ATOMS

Continued from page 1

the Dark Ages, matter was clumped into massive structures such as the billion-solar mass black holes powering the quasars detected in the new observations.

In addition, while the Big Bang created only hydrogen, helium and a trace amount of lithium, the quasar light reveals traces of more complex atoms including carbon, nitrogen, oxygen and silicon, all of which had to be cooked up in stars out of the primordial material.

At the end of the Dark Ages, hydrogen atoms were ionized again, or stripped into atomic nuclei and electrons. This reionization was probably caused by ultraviolet light from the first quasars and stars. Until now, the timing of this reionization event has been uncertain.

In 1965, Jim Gunn and Bruce Peterson, then at the California Institute of Technology, predicted that the neutral atoms would be detected by their light-absorbing signature, creating a trough in the spectrum. Hydrogen atoms absorb all the light at a particular, characteristic wavelength, Becker said. If at least one part in 100,000 of the hydrogen in intergalactic space were made up of whole atoms, all the light at this wavelength would be blocked, he said.

"Seeing the effects of neutral hydrogen in the spectrum of this quasar is telling us that we're finally probing the universe to a time when the first stars and quasars lit up," said Gunn, now at Princeton University and the project scientist of the SDSS. "Scientists have been looking for this for a very long time; it is tremendously gratifying that we are finally seeing it."

Because light from objects that are distant in space and time is shifted toward the red end of the spectrum, the Gunn-Peterson trough would also be shifted, Becker said. By looking at where in the spectrum the trough occurred, astronomers could tell how old those atoms were, he said.

To achieve this, astronomers have to look at objects billions of light years away and therefore far back in time. But in 35 years, no one has been able to detect the Gunn-Peterson effect, Becker said. The conclusion was that almost all of the hydrogen in intergalactic space is ionized.

"Only now have we found a quasar that is far enough away," Becker said.

Using the powerful Keck telescope on Mauna Kea in Hawaii, Becker and his colleagues detected the imprint of neutral atoms on light from quasar J1030+0524. J1030 is the most distant object yet found, at 14.5 billion light years from Earth. It was discovered in April this year by the Sloan Digital Sky Survey scientists, led by Fan.

The researchers spread out the recorded light into its constituent wavelengths. They found that, over a region of the spectrum corresponding to millions of years of cosmic history, no light from the quasar gets through — it is all absorbed in intergalactic space.

"The culprits responsible are from the very first generation of atoms. These observations provide our first glimpse at truly primordial material, and constrain the time at which the reionization of the universe took place," Becker said.

The results will be submitted to the *Astronomical Journal*. The Keck observatory, which houses the world's largest telescope, is jointly managed by the California Institute of Technology, the University of California, and NASA. The Sloan Digital Sky Survey aims to map in detail one quarter of the sky and 200 million celestial objects. Funding for the Sloan Digital Sky Survey has been provided by the Alfred P. Sloan Foundation, the participating institutions, the National Aeronautics and Space Administration, the National Science Foundation, the U.S. Department of Energy, the Japanese Monbukagakusho, and the Max Planck Society. The Sloan Digital Sky Survey is a joint project of the University of Chicago, Fermilab,

the Institute for Advanced Study, the Japan Participation Group, The Johns Hopkins University, the Max-Planck-Institute for Astronomy (MPIA), the Max-Planck-Institute for Astrophysics (MPA), New Mexico State University, Princeton University, the United States Naval Observatory, and the University of Washington.



NEWSLINE
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